

We Claim:

1. A method of establishing a data transfer connection between a first node and a second node across a domain which only allows unidirectional data flow, the method comprising:

a) sending a setup message from the first node to the second node, said setup message containing a first connection service label for a backward direction of data flow, said backward direction being from said second node to said first node;

b) receiving said setup message at said second node and reserving said first connection service label for data being sent from said second node to said first node;

c) sending a response message from the second node to the first node, said response message containing a second connection service label for a forward direction of data flow, said forward direction being from said second node to said first node; and

d) receiving said response message at said first node and reserving said second connection service label for data being sent from said first node to said second node,
wherein

for forward data transmission in said forward direction, data packets for said forward data transmission will be labelled with said second connection service label and for a backward data transmission in said backward direction, data packets for said backward data transmission will be labelled with said first connection service label.

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2. A method as in claim 1 wherein nodes in said domain implement a specific unidirectional protocol.

3. A method as in claim 2 wherein said protocol routs data transfer units based on at least one transport label carried by said units.

4. A method as in claim 1 wherein said setup message is labelled with a first predetermined control service label control messages being sent in said forward direction.

5. A method as in claim 4 wherein said response messages is labelled with a second predetermined control service label for control messages being sent in said backward direction.

6. A setup message sent from a first node to a second node for establishing a data transfer connection across a domain which only allows unidirectional data flow, said setup message containing a connection service label to be used by said second node when transmitting data to said first node on said data transfer connection.

7. A setup message as in claim 6 wherein nodes in said domain implement a specific unidirectional protocol.

8. A setup message as in claim 7 wherein said protocol routs data transfer units based on at least one transport label carried by said units.

9. A response message sent in response to a setup message from a first node establishing a data

transfer connection across a domain which only allows unidirectional data flow, said response message being sent from a second node to said first node and containing a connection service label to be used by said first node when transmitting data to said second node on said data transfer connection.

10. A response message as in claim 9 wherein nodes in said domain implement a specific unidirectional protocol.

11. A response message as in claim 10 wherein said protocol routs data transfer units based on at least one transport label carried by said units.

12. A data transfer unit being sent from a transmitting node to a receiving node, said data transfer unit having a service label indicating a processing context that determines how said unit is to be processed by said receiving node, said unit being used in a unidirectional data transfer connection and said service label being determined by said receiving node.

13. A data transfer unit as in claim 12 wherein said unit routed through a domain based on at least one transport label carried by said unit.

14. A data transfer unit as in claim 12 wherein the service label is associated with a transport label switched path and specific service bindings.

15. A first network switch for bridging between a first domain which only allows

unidirectional flow and a second domain, the first switch including:

- a first module for transmitting or receiving first data transmission units to or from the second domain;
- a second module for transmitting or receiving second data transmission units to or from the first domain;
- a switch core module placed between the first and second modules for switching data between the first and second modules,

wherein the first network switch executes computer readable and computer executable instructions for implementing a method for establishing a data transfer connection between the first network switch and a second network switch across the first domain, the method including:

- a) sending a setup message from the first network switch to the second network switch, said setup message containing a first connection service label for a backward direction of data flow, said backward direction being from said second network switch to said first network switch;
 - b) receiving a response message from the second network switch, the response message containing a second connection service label for a forward direction of data flow, the forward direction being from the second switch to the first switch and reserving said second connection service label for data being sent from said first switch to said second switch,
- such that
- for forward data transmission in said forward direction, data packets for said forward data transmission will be labelled with said second connection service label and for a backward data

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transmission in said backward direction, data packets for said backward data transmission will be labelled with said first connection service label.

16. A switch as in claim 15 wherein nodes in said first domain implement a specific unidirectional protocol.

17. A switch as in claim 16 wherein said protocol routes data transfer units based on at least one transport label carried by said units.

18. A switch as in claim 15 wherein said setup message is labelled with a first predetermined control service label control messages being sent in said forward direction.

19. A switch as in claim 18 wherein said response messages is labelled with a second predetermined control service label for control messages being sent in said backward direction.

20. A switch as in claim 15 wherein the first domain is an MPLS (Multi-Protocol Label Switched) domain and the second domain is an ATM domain.